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UNITED STATES DEPARTMENT OF AGRICULTURE

MISCELLANEOUS CIRCULAR NO. 19

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FOREST FIRES IN THE INTERMOUNTAIN REGION

PREPARED BY THE INTERMOUNTAIN DISTRICT OF THE FOREST SERVICE

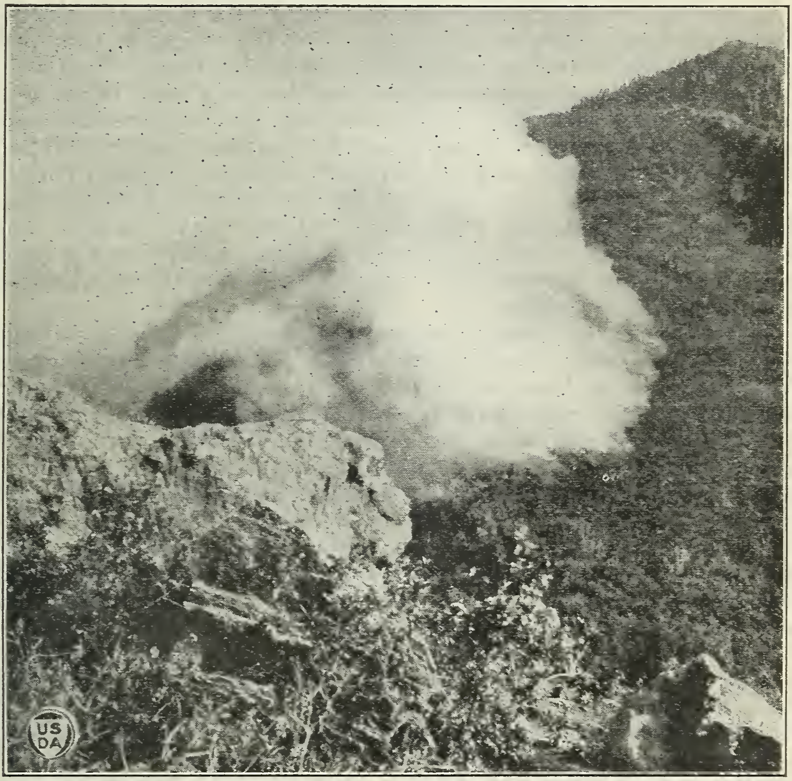


FIG. 1.—"Only a brush fire." Such fires are frequent in the intermountain region and destroy thousands of seedlings.

Each year in the intermountain region there are from 400 to 700 forest fires, many of which are caused by human carelessness. They burn large areas and destroy natural resources worth many thousands of dollars. Forest fires are not popularly regarded as serious in this region because the immediate damage is much less than in the Northwest, where extremely valuable timber stands may be destroyed by them. The indirect damage from forest fires in this region is tremendous, however, and strikes at the very root of the prosperity of the intermountain region by threatening the permanence of water supplies so necessary to agriculture and to the life of cites and towns, to say nothing of the losses in timber and the destruction of forage resources. In order to combat these fires a large force of men is required. If the public would realize its responsibility for forest fires, nearly half of them could be prevented, and the Federal Government would be relieved of the burden of maintaining a fire-fighting organization of such proportions as is now necessary. At the same time, the damage done would be greatly decreased.

THE IMPORTANCE OF FIRES.

Down the city street comes the wild clang of a gong and the roar of heavy wheels. Nearer and nearer come the trucks at full speed, while automobiles and pedestrians scatter before them. Everything gives way to the fire department as it speeds to the fire. Perhaps we, too, hurry along with the crowd in the direction it has gone and watch the men as they work with the powerful engines, high ladders, and great streams of water to put out the flames that are destroying the stores and homes men have labored hard to build and the merchandise they have struggled to acquire. "Good they got here when they did," we say to our neighbors standing near, "or the whole thing would have burned up." "Must have lost a thousand dollars as it is," someone replies.

Similar scenes on a smaller scale are common in towns and villages, where the clanging of the fire bell arouses the volunteer fire fighters. They rush out the hose and hurry to the scene of the fire, bending every energy to prevent the flames from destroying valuable property.

Smoke appears back in the mountains, billowing up over the distant ridges and spreading hazily across the sky. Who gets excited? Who worries about the damages being done back there? Very few. "Just a brush fire—a few worthless trees maybe," we say to our neighbor. "We have always had brush fires. They can't be prevented, and they don't really do any harm. Of course, those big forest fires in the Northwest are a different thing. But these—these don't amount to anything."

Back in the mountains, however, are the men who know better. A lone lookout in his little cabin on some high barren mountain peak, incessantly scanning the country, sees the tiny, far-away wisp of smoke. He telephones to others. The fire is definitely located, and in a few minutes fire fighters on horseback are off across the canyons and mountains to the fire. No clanging of gongs here, no speed and rush, no spectacular thrills, no admiring throngs. It is just simple hard work with axe and shovel out in the distant mountains, putting out a fire about which few people care. It cost nobody money to clothe these hills with brush or to put those trees there. Nobody expects to get much money out of those forests. Their destruction seems to hit nobody's pocket book. But is it really true that nobody's pocketbook is hit? Let us look further.

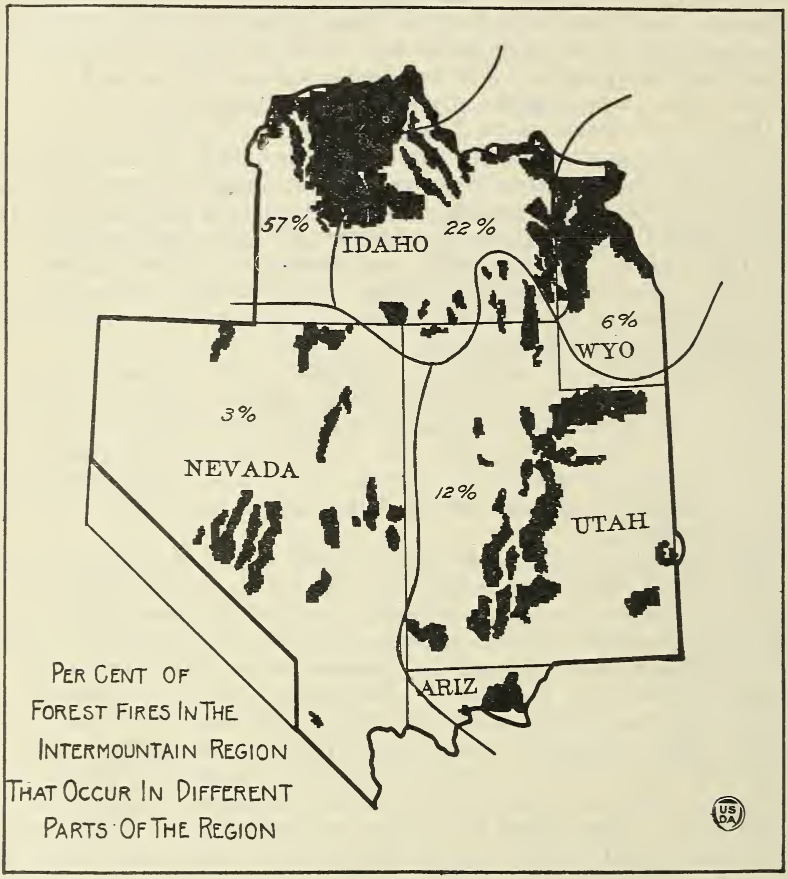
NUMBER AND SIZE OF FIRES IN THE INTERMOUNTAIN REGION.

The intermountain region is popularly regarded as one in which forest fires are few and very small. It is true that this region has never suffered any such great conflagrations as have occurred from time to time in Michigan, Minnesota, and the Northwest. This broken mountainous country lacks the great continuous bodies of timber found in other regions, and fires start somewhat less easily and spread over less extensive areas. Nevertheless, in ordinary years from 400 to 500 forest fires occur here annually, and sometimes, as in 1919, there may be more than 700 fires in this region, popularly supposed to be almost without fire hazard. In the summer time, when smoke drifts in, it is commonly believed that all the fires are in northern Idaho and the far Northwest, for those fires are the ones that attain newspaper prominence. Nevertheless, in the 15 years the Forest Service has been fighting forest fires and keeping records in this region, 606,279 acres have been burned over. This is proof enough that the forests are very inflammable, and that tremendous fires can start and extend over large areas. In 1910, when weather conditions were very bad, fires covered several hundred thousand acres in this region. It is perfectly possible that such conditions may be repeated.

Consider what the burning of 600,000 acres of forested lands means. This area is practically 1,000 square miles—a territory almost as large as Cache County in Utah, or Ada or Bear Lake Counties in Idaho. Imagine an entire county devastated by fire, left desolate and barren. This is what forest fires mean in this region, and each year the area is being added to—a few thousand acres annually.

Figure 2 shows that the number of fires varies in different parts of the region, the worst situation existing in western Idaho. It would be an unwarranted conclusion from this showing that on the Utah and Nevada National Forests fires are so unlikely to occur that no efforts need be made to prevent or suppress them. Even within the last few years, with the Forest Service constantly on the alert, an area of about 10,000 acres was burned over in one year on the Cache National Forest near the Utah-Idaho line; and in Nevada, a State usually marked by very few and small forest fires, 3,000 acres were swept by flames on the Humboldt National Forest in one year. Throughout this region of southeastern Idaho and of Utah and Nevada, barren areas that testify eloquently of ancient fires are not hard to find. Furthermore, men who have studied the problem carefully say that the great stretches of quaking aspen found throughout the mountains of this region all show the marks of early fires, and, indeed, that these aspen stands owe their existence to such fires.

Lodgepole pine, too, is a species which almost always comes in on old burns. Vast areas in western Wyoming and southeastern Idaho are covered with trees of this species to the exclusion of all else. Nearly all these areas, too, are believed to mark ancient burns. Out of a total of about 18,000,000 acres covered with forest in this intermountain region about 4,500,000 acres are covered with lodgepole pine and 2,000,000 with aspen. This seems to indicate that about one-third of the area has been burned over at some time. Without question these forests are very inflammable, and tremendous conflagrations will develop in them if fires are given a chance to start. This inflammability is not a condition of the past, but exists now.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PER CENT OF FOREST FIRES IN THE INTERMOUNTAIN REGION THAT OCCUR IN DIFFERENT PARTS OF THE REGION
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FIG. 2.

Not long ago, on the Teton National Forest in western Wyoming, rangers, who were burning brush after a foot of snow had come on the ground, found that the fire would run in the dry duff and litter under the snow, and that, if it reached some distant dry stump, would generate enough heat to send up a column of smoke and steam over the area of the fire. One can readily imagine what would happen in a country like this in the heat of midsummer.

WHAT CAUSES THE FIRES.

There is a general belief that forest fires are nearly always started by something beyond the power of man to prevent, such as lightning, dry limbs rubbing together in the wind, or broken bottles acting as lenses to concentrate the rays of the sun. Nothing could be further from the truth. There are only two causes of forest fires in this region. They are human carelessness and lightning. Of the two, human carelessness is responsible for the greater number, as less than half of the fires in the intermountain region are caused by lightning (fig. 3). Records of the past 15 years show that 47 per cent resulted from lightning, 35 per cent from the carelessness of campers, 6 per cent from brush burning in which the fire was allowed to escape, 5 per cent from locomotive sparks, 4 per cent from

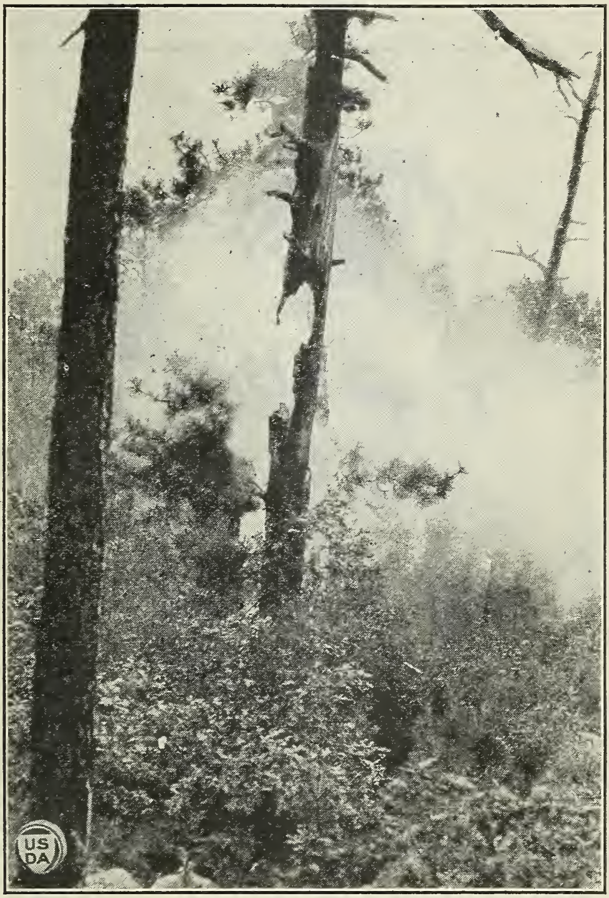


Fig. 3.—Fires started by lightning are unavoidable; those started by man are inexcusable.

miscellaneous unlisted causes, 2 per cent from incendiarism, and 1 per cent from the carelessness of lumbermen.

Lightning fires are not distributed evenly over all the intermountain region. Figure 4 shows the percentage of fires caused by lightning in the different parts of this region. In western Idaho lightning-caused fires are most frequent, forming 62 per cent of all the fires. In eastern Idaho lightning causes only 21 per cent of the fires. In the high mountains of western Wyoming about one-third, in Utah about one-fourth, and in Nevada about one-tenth of the fires are due to lightning.

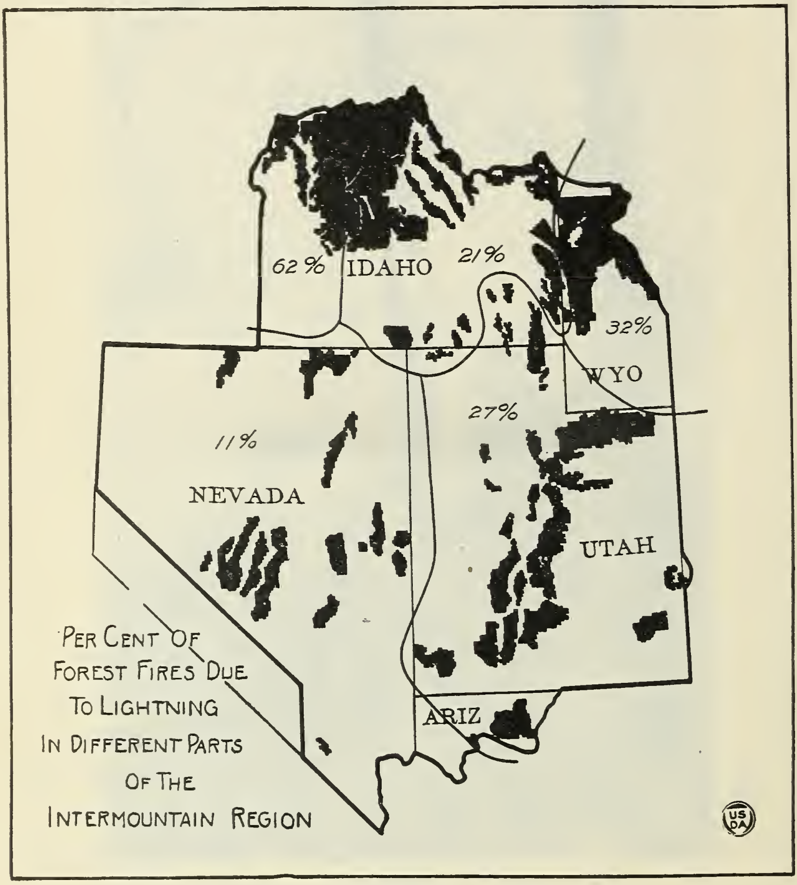


Fig. 4.

Compare lightning with the careless camper as a cause of forest fires. In southeastern Idaho campers are responsible for about three times as many fires as lightning, and in Nevada for nearly four times as many. In western Wyoming nearly two-thirds of all fires are caused by campers and only about one-third by lightning. It is only in the forests of western Idaho that lightning is more active than careless campers in starting fires. Here about two-thirds of the fires are caused by lightning and only about one-fourth by campers.

It must be remembered in the above statements that only one kind of human carelessness—that of campers—has been mentioned. Sparks from locomotives, brush burning, and other agencies controlled by people make a further addition to the list of fires caused by human beings. It is obvious that if people would be careful with fire in the woods the fire problem would practically be solved, except in a few forests of western Idaho, where lightning is, indeed, a very serious proposition. Taking the intermountain region as a whole, human beings constitute a much greater problem than any other agency where forest fires are concerned. On more than three-quarters of the area the danger from persons far outweighs the danger from lightning.

In some forests of the country the human problem is largely the problem of the incendiary, who sets fire to the forests when conditions are the very worst and who is accordingly very destructive. The intermountain region, fortunately, is almost free of the "firebug," incendiary fires averaging only about 2 per year for the whole region. People of the intermountain country generally realize that the effects are deplorable, although they are prone to underestimate the damage which is done. Accordingly, incendiary fires in this region are rare except in Nevada, where 6 per cent of the fires are of this character. This is largely explained by the fact, disclosed in records that are an average for the past 15 years, that there has been some incendiarism on the part of grazers who have thought that burning the range improved forage conditions. This belief has now been overcome, and the forest fire started by intention is becoming more rare. Human carelessness, then, is the big problem. It necessitates a large fire-fighting force and much special work, not only in putting out but also in preventing forest fires.

DAMAGE DONE BY FOREST FIRES.

It is a very difficult thing indeed to estimate exactly, in dollars and cents, the damage from a forest fire. It is relatively easy to estimate the amount of timber destroyed; but if the timber was standing in distant and inaccessible valleys where it probably would not have been cut for many years it is difficult to put a price upon it. It is still more difficult to value the forage destroyed. These are the most obvious of the losses, and they are comparable to the losses an insurance adjuster examines into when a city building burns. Once the building is destroyed, however, the damage is done. The insurance is paid, and probably a building better than the first arises to take its place. It is different with the forest fire. When the first damage has been done the real destruction has just begun. In forestry the present crop of timber is not the only thing to deal with, but generations of little trees yet to come must be considered, also, the forage conditions as they will be next year, the year after, and for many years after that. Finally, the earth itself on the burned-over areas must be considered. In this region of irrigated farms the value of the timber and forage is by no means the greatest of all the values which the forest possesses. The irrigation water, the very life blood of the region, depends upon the proper covering of the watersheds. Destroy the forest, and the irrigated farming, together with the visible timber and forage, is destroyed.

TIMBER VALUES DESTROYED.

The difficulty of putting a value in dollars and cents upon the timber destroyed arises partly from the fact that some of the timber is remote and has little present commercial value. Nevertheless, it will all have value at some time, and a high value at that, because a period of timber shortage is approaching.

Timber is being sold for about $3 per thousand feet. It does not, therefore, seem out of the way to place a value of about $1.25 per thousand feet on the timber which is annually destroyed by fire.

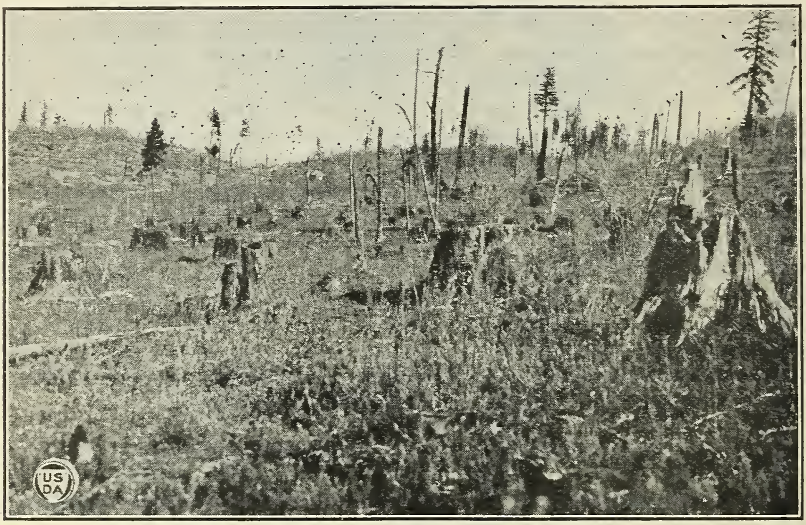


FIG. 5.—Desolation follows fire.

Looking over the records for the past 15 years it is seen that forest fires in this region have destroyed practically 600,000,000 feet of timber. This is as much timber as there is on some of the national forests, and it means a tremendous loss both now and for the future. The value of this timber amounts to about $750,000 at the conservative figure of $1.25 per thousand feet.

At the same time that present timber values are being destroyed the fires are wiping out vast amounts of reproduction, the little trees that would some day have made good stands of timber for the people of the future, who will probably need timber fully as much, and perhaps more than we do now. What people will be paying for it in a hundred years can not be estimated, and therefore it is impossible to say what it is worth now. Even if timber were estimated to be no more valuable then than it is now, we find that forest fires during the last 15 years have destroyed reproduction valued at $500,000.

Much more is really being lost, however, than is indicated by these figures. Consider, for example, some of the brush fires which so frequently occur in the foothills. They run through sagebrush or oak, and it is often thought they do no damage. In a great many places it will be found that little trees only a few inches high, standing perhaps hundreds of feet from their parents, were destroyed by some one of these fires. It is hard for evergreen trees to gain a foothold on these brushy areas. Their seed may be sown annually for many years by parent trees, and yet the whole result will be only a scattering growth of little trees. One fire may undo the work of a score of years. When the fire is over the older trees again renew their work of broadcasting seed. It may happen that within the next 10 or 15 years enough favorable seasons will occur to allow a meager scattering of little trees to start again on the old burn. Once more the brush comes in, inflammable débris accumulates, a careless human being comes by with a match, and the process starts all over again. In time the old parent trees die and fall, leaving no progeny, and the brushwood extends a little farther into the mountains. (Fig. 5.)

The forests are constantly trying to extend themselves into the brush lands which produce no timber. To the extent to which they succeed they are increasing the productive areas naturally. All they want is a chance, but fires once in 20 to 30 years are able to put a stop to this entire process. The resultant loss is difficult to estimate.

LOSS OF FORAGE VALUE.

Forest fires do not destroy forage values far into the future in the way forests are destroyed. Nevertheless, they destroy the growth of the present year and sometimes that for several years to come. During the last 14 years $50,000 worth of forage has been destroyed in the intermountain region. This means the grazing for about 75,000 cattle for one year. Seventy-five thousand is a large number of cattle, and the destruction of forage for so much stock means a great deal in this region, even if the next year's crop comes on all right.

LOSS OF WATERSHED PROTECTION.

The values previously discussed are very real, and their loss can be appreciated by everyone. Much less apparent, but really worst of all, are the losses that come through the destruction of watershed protection. The greater part of the intermountain region depends upon irrigation for its prosperity, and the degree to which this region flourishes depends in a very large measure upon the amount, the evenness of the flow, and the clearness of this water. There must be plentiful supplies so that the water will cover the maximum amount of ground. It must flow as evenly as possible through the season so that crops will not suffer through lack of late water. It must be reasonably clear water, because water which carries a large amount of sediment clogs up dams, ditches, and canals, fills reservoirs, and makes irrigation so expensive that its benefits are more than offset by its cost.

The flow of water from the mountain streams would not cease even if all forests and vegetation were removed from the mountain sides. The snow banks would continue to pile up, the heavy rains of summer would still fall profusely on all these high mountain ranges, and the mountain streams would continue to be the main means of watering the valleys. Nevetheless, under these circumstances, the total amount of usable water reaching the valleys would be less. It is cer-

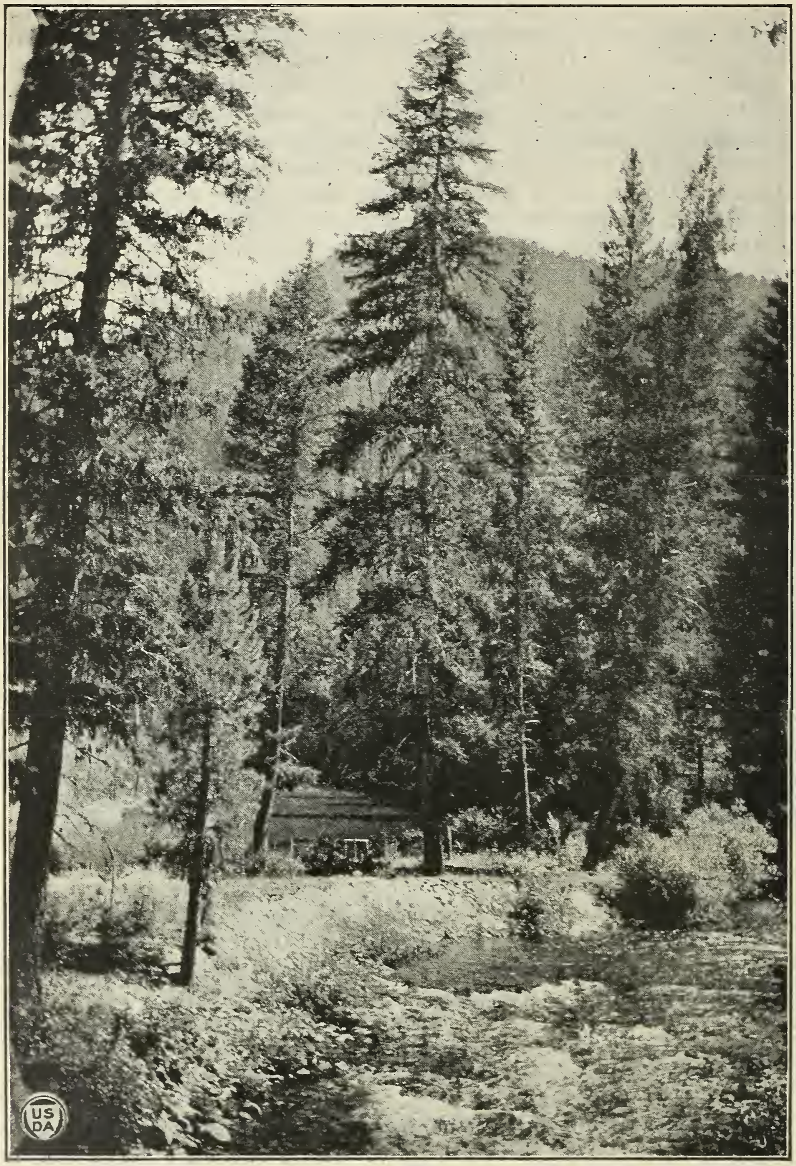


FIG. 6.—The forest untouched by fire.

tain that one rush of water would come down in the spring and that the streams would dwindle away to nothing in the summer, except when some heavy summer storm caused another rush of water and a local flood. It is also clear that the water would carry with it tremendous amounts of loose earth, rocks, and sediment of all kinds. Under these circumstances, the usefulness of reservoirs would be impaired, the cost of maintaining canals and ditches would be excessive, and the amount of usable water would be greatly reduced. Probably half of the wonderful agricultural values of this region that have been built up through irrigation would disappear. If the amount representing this loss be divided by the number of acres from which irrigation water is secured in this district, it is found that the value of a well-protected watershed amounts to something like $8 an acre. During the last 14 years 602,000 acres have been burned over whose value for watershed protection at this rate would be nearly $5,000,000.

It is not often that all of this value is lost permanently, however, for nature always "stages a comeback" and tries to restore a cover of vegetation to the denuded hillsides. But, although in 5, 10, or 20 years, depending upon the location of the burn, the new cover may afford a degree of protection to the watersheds, the full protection of a mature forest is not regained for many years. Through southern Idaho and central Utah, where the forests are least thrifty and the climate is driest, the process of reforestation is slow indeed. The greatest losses occur, therefore, in the region where they can be afforded least.

There is still another form of loss, and although its value is very hard to reckon in money, it is perhaps the one most keenly felt by most of the public. This is the loss of recreational values. The forests are loved for their own sakes, for the beautiful scenery contained in them, and there is a very keen sense of disappointment and loss when these playgrounds are found burned, blackened, and destroyed. The camper who has once spent a happy vacation in some tree-filled hollow feels a sense of personal loss when he comes again upon the place and finds only a few blackened snags and a dirty mud-filled stream. This loss outweighs in his mind the loss of timber, watershed protection, and everything else. It is hard to say what this recreational use of the forest is worth in money, but the value is very real.

Fires destroy hunting of all kinds. Wild animals find their forage destroyed and their hiding places left open. The game birds can find no food and no hidden places in which to nest and rear their young. The naked soil is washed into the streams after the first rain and carries with it lye from the leached ashes, which kills the fish and renders the streams unsuitable for their propagation for many years. In this way fires at the headwaters of the Salmon River, where the salmon spawn, are capable of exercising a very real influence upon the salmon industry of the Pacific coast. The average fisherman, however, who goes out into the woods to fish, feels more keenly his personal loss. He would willingly go without canned salmon forever if he could find a well-stocked stream flowing through an attractive country in which to camp.

WHAT IS BEING DONE TO REDUCE FOREST FIRES.

In several of the small towns in the intermountain region where forest fires are most frequent and dangerous you will find special offices of the Forest Service. These are fire dispatchers' offices. Drop in some hot summer afternoon and see what sort of a place you have there for the protection of your forests. You will see no shining brass of powerful engines, no hose, no ladders, or other tools of the city fire fighter—just a small room with many maps on the wall, and a big desk where a man sits with a telephone close at hand. Perhaps quiet reigns, and you may find the fire dispatcher in charge glad to talk with you. Soon the telephone bell rings. You can gather from the one side of the conversation that Ranger Black is on his way down to the Johnson corral, if anybody wants to know where he is. Then from another call it seems that Tiptop lookout wants some potatoes and kerosene as soon as possible. Tiptop is 60 miles away and 5,000 feet above the surrounding valleys. The dispatcher suspends his talk with you while he calls the storekeeper in another town and tells him to be sure to include kerosene and "spuds" in the order going out by pack train early next morning, carrying supplies to all the "back country." Another call comes.

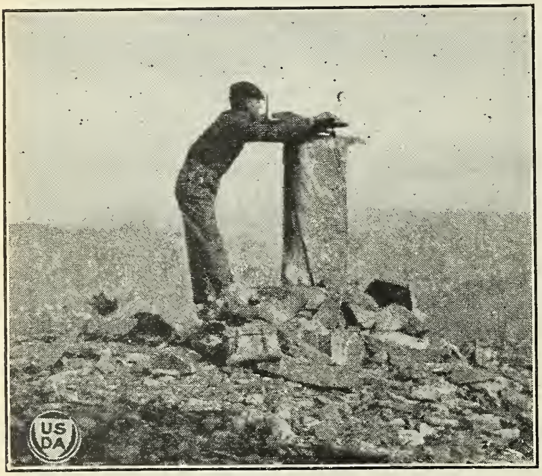


Fig. 7.—Operating a fire finder under difficulties.

"What's that—106?" snaps the fire dispatcher, "Fork of Bear Creek?" You know by his manner that something different has come over the wire. "Yes; Lone Peak ought to see that. I'll call them." And he hangs up.

"Fire up Bear Creek way. Smoke coming up pretty good," he says as he cranks the telephone.

"Hello, Lone Peak? * * * Oh, just trying to get me, were you? * * * Yes, Tiptop reports it on 106. * * * Three twenty-eight for you, is it? * * * All right; we'll have somebody after it right away."

He hangs up the receiver and goes to a map, where he takes two threads, one fastened at Lone Peak and one at Tiptop. Around each of these points is a circle graduated into 360°. He swings the threads so that the one from Tiptop cuts the circle at 106°, and the one from Lone Peak cuts its circle at 328°. The two lines cross at a point down near the forks of Bear Creek, just as Tiptop judged. Again the dispatcher sits down at his telephone. He gets "Smokechaser" Smith.

"Smith," he says, "there's a fire down on the mountain between the forks of Bear Creek. Tiptop and Lone Peak both see it, and it seems to be starting pretty lively. Get down there as fast as you can. Pick up the prospector, Owens, if you can find him at his place, and take him along. If the fire looks bad, send him over to Deer Hollow for the crew that's building trail there. You stay right with the fire. The lookouts will keep us posted. If you can't get Owens, and if it gets worse, we will get the trail crew in to help you."

Next he intercepts Ranger Black, through the kindness of Mrs. Holcomb, whose ranch he must pass on his way to Johnson's corral. He informs him of the fire and tells him to be ready to shoot in reinforcements, for the weather is hot and dry and the place dangerous. Then for a time all is quiet again. The lookouts in an hour or so may report the smoke abating or may be getting worse. Then there is more telephoning. Men are notified at distant ranches. Tools, rations, camp outfits, cooking utensils, all prepared in units for just such times, are pulled out of the storehouses, packed onto horses' backs in a few minutes, and are soon off across the mountains. An organization, complete in all details, arises as if by magic through the agency of the telephone. The fire is directed from perhaps 60 miles away by a man who never sees the flame or even smells the smoke, and who may not even know the fire-fighters except as distant voices at the other end of the wire. All night long the dispatcher may sit at his desk, calling here and there, and listening to reports. Out in the forest the men are working or resting, ready to jump on the fire at the first glimmer of morning light.

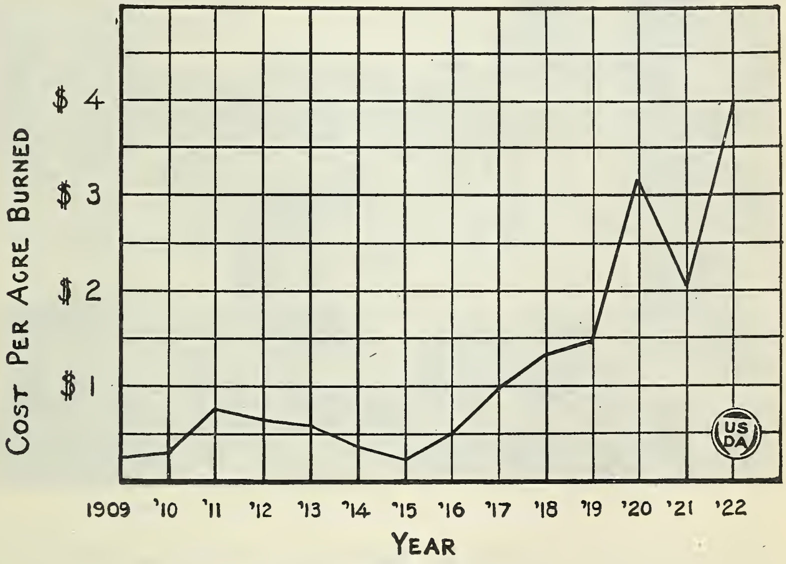


FIG. 8.

This is what is being done to stop forest fires. The United States Forest Service and the South Idaho Timber Protective Association (an organization of owners of private timber land, which also includes the State of Idaho as a member) both have built up organizations for controlling forest fires. Not in all parts of the intermountain region is the organization so complete as pictured above. Every-where, however, are fire detection and suppression organizations competent to handle effectively the fires starting in the region. In 1910, when the organization was young, in a season of extreme fire hazard, 384 fires burned over 193,742 acres. Nine years later came another hot, dry year, and an area of approximately the same extent was burned over, 192,888 acres. There were, however, 704 fires to cope with, nearly double the number that occurred in 1910. The year 1909 was an easy year, with only 152 fires and only 4,455 acres burned The year 1922 was not a bad fire season either. The fire-fighting organization was much more effective, however, and 542 fires covered an area of only 3,652 acres. There were over three times as many fires as in 1909, but a smaller area was burned. The organization is doing good work, is improving every year, and is a powerful factor in reducing fire losses.

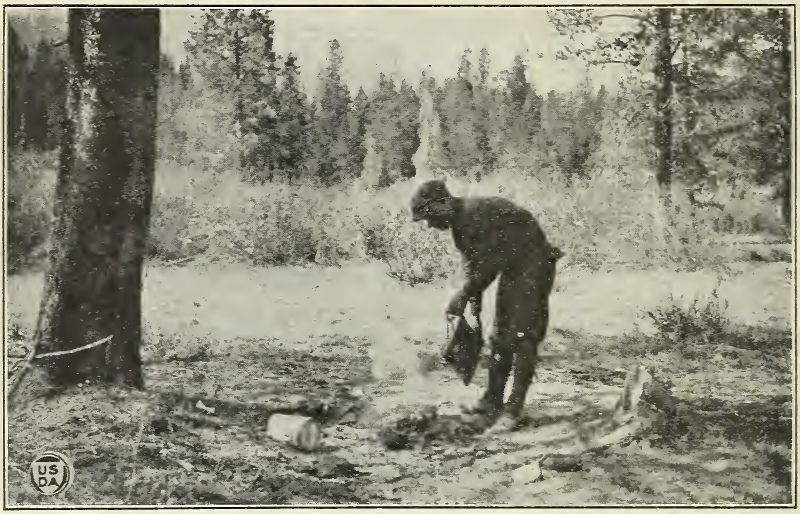


Fig. 9.—Putting out a camp fire left by careless campers.

But such things cost money. Figure 8 shows how the cost per acre burned over each year has risen from 1909 to the present time. The area burned over is being reduced each year, but at considerable expense. Still, so long as the fires are started, there is no other way by which protection can be achieved. If the human element could be done away with, or even greatly reduced, matters would be very much improved, for it is the fires caused by human beings that give the fire-fighting forces the most trouble. Lightning fires start frequently upon high ridges or places where isolated dead trees stand out boldly. Such places are easily seen by the lookouts, and fires do not readily spread on the rock tops of high ridges. Fires started by human beings are at first almost always hidden away along some trail or stream in the canyon bottoms or at the foot of slopes where the fire can quickly assume a large size.

The most logical thing to do is to get rid of fires started by human beings. Campers start the greatest number of man-caused fires. They must learn to be careful with fire in the mountains if the destruction is to be stopped, and if the cost of fire-fighting is to be reduced. (Fig. 9.)

From Figure 10 it is seen that progress is being made along this line, as the percentage of fires caused by human beings shows a downward trend year by year. The whole future of forest protection in this region depends upon the reduction of man-made fires, as lightning is a very small factor. This object can be achieved if every person who goes into the forest will carefully observe the following six rules:

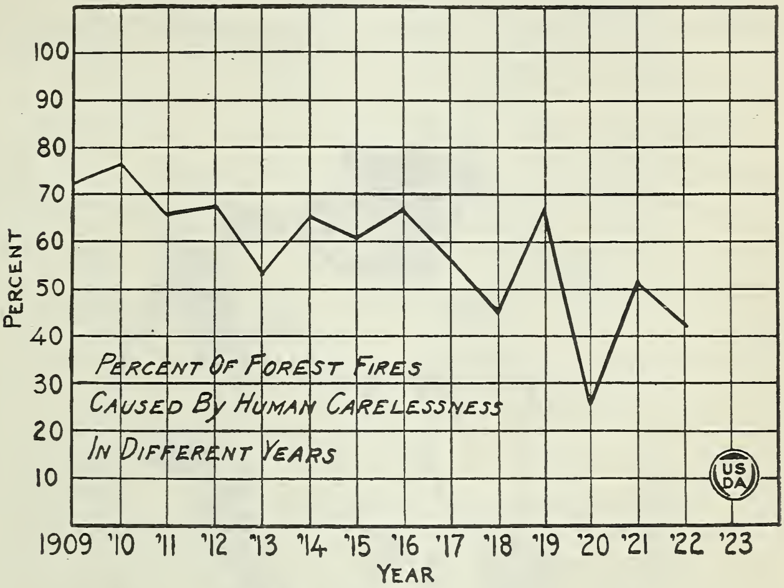


Fig. 10.

1. MATCHES. Be sure your match is out. Break it in two before you throw it away.

2. TOBACCO. Throw pipe ashes and cigar or cigarette stumps in the dust of the road and stamp or pinch out the fire before leaving them. Don't throw them into brush, leaves, or needles.

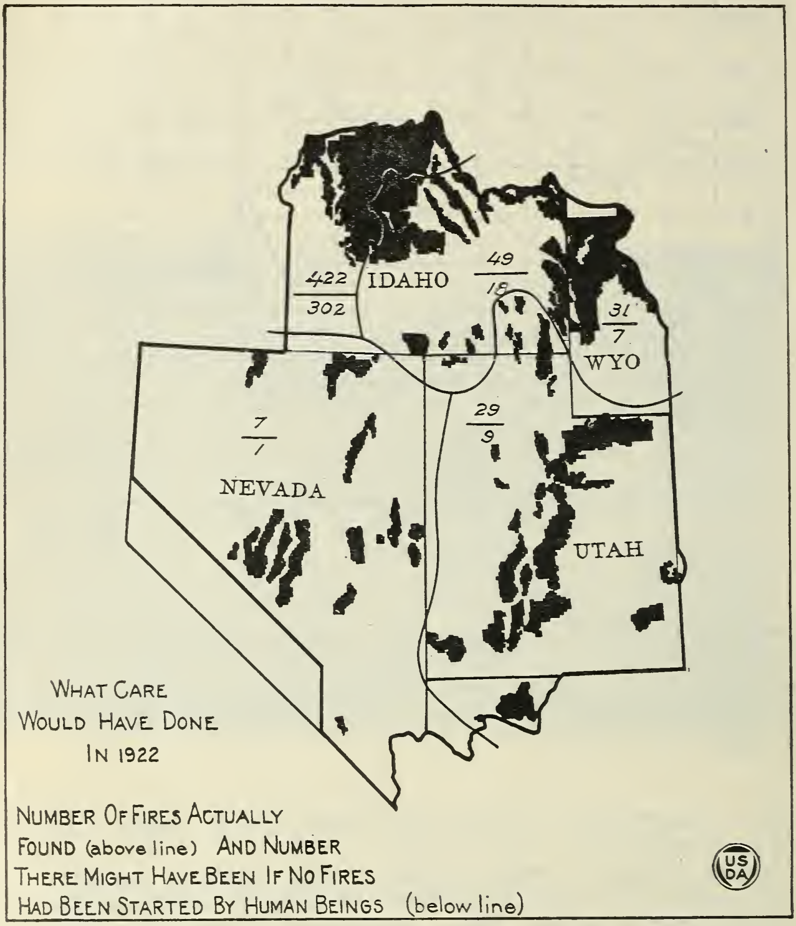
3. MAKING CAMP. Build a small camp fire. Build it in the open, not against a tree or log or near brush. Scrape away the trash from all around it.

4. LEAVING CAMP. Never leave a camp fire, even for a short time, without quenching it with water or earth.

5. BONFIRES. Never build bonfires in windy weather or where there is the slightest danger of their escaping from control.

6. FIGHTING FIRES. If you find a fire, try to put it out. If you can't, get word of it at once to the nearest U. S. forest ranger. Keep in touch with the rangers.

Use care! Figure 11 shows what might be done. In 1922 public carefulness would have reduced the number of fires in all the regions except western Idaho to a very small number of lightning fires, a problem easy to deal with. The public is learning to be careful, but the national forests are becoming more and more popular; people from the Middle West are coming in with their cars, people who never saw a forest, who know nothing of forest fires. The story of the disastrous consequences of forest fires must go to every person in this region, and the readers of this pamphlet are expected to help spread the message.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302
IDAHO
49
18
31
7
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UTAH
WHAT CARE
WOULD HAVE DONE
IN 1922
NUMBER OF FIRES ACTUALLY
FOUND (above line) AND NUMBER
THERE MIGHT HAVE BEEN IF NO FIRES
HAD BEEN STARTED BY HUMAN BEINGS (below line)
US
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FIG. 11.

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